

Application. No. 10/776;
Amendment dated July 10, 2006
Reply to Office Action of January 9, 2006

Amendments to the Specification:

Please replace the Abstract with the following amended paragraph.

An automatic tissue sampling apparatus for use with a biopsy needle set having an inner needle and an outer cannula is provided. ~~The apparatus includes a housing defining an interior cavity and having a forward end defining an opening for passage of the inner needle and outer cannula. A pair of carriers are each slidably disposed within the interior cavity of the housing and have a portion configured to support one of the inner needle and the outer cannula. A spring is disposed within the interior cavity in operable engagement with each carrier. The springs have a cocked position in which the mechanism stores potential energy and a firing position in which the mechanism releases the potential energy to drive the corresponding carrier toward the forward end of the housing.~~ The apparatus includes a slidably disposed, spring-biased carrier for each of the inner needle and cannula. A cocking mechanism is operable to sequentially move the first carrier driving mechanism to its cocked position and the second carrier driving mechanism to its cocked position. The cocking mechanism includes a manually operated cocking lever positioned outside the housing for single handed manipulation while holding the housing. A force transmission mechanism is operably coupled between the cocking lever and the carriers and configured so that the force required to manually depress the cocking lever to force the springs to the cocked positions does not increase as the springs are compressed.

Please replace paragraphs 29, 30, 36, 50 52, 58, 61, 63 and 66 of the disclosure with the following paragraphs.

[0029] FIGURE 31 is a ~~[[top]]~~ side elevational view of the embodiment shown in Figure 30.

[0030] FIGURE 32 is a ~~[[top]]~~ side elevational view of the embodiment shown in Figure 30.

[0036] Referring also now to Figures 2-4, the device ~~[[20]]~~ 10 includes a rearward carrier assembly 50 configured to receive, support and carry one of the needle hubs. In one embodiment, the rearward assembly is configured to carry an inner stylet hub. The rearward carrier assembly 50 includes a

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rearward carrier 52, a rearward drive mechanism 55 and a rearward retaining member 58. The rearward carrier 52 has a hub support portion 54 and a rearward drive portion 53 mounted on the center shaft 40 in the rearward portion 27. The rearward carrier 52 is movable on the center shaft 40 along a path substantially parallel to the longitudinal axis *l* of the housing between a first resting position as shown in Figure 2 and a first cocked position as shown in Figure 3.

[0050] Referring again also to FIGS. 6 and 7, the force transmission mechanism 75 is engaged between the cocking lever and the cocking slider. The mechanism 75 translates the pivoting movement of the cocking lever 70 to the sliding movement of the cocking slider 90 in the rearward direction R against the carriers 52, 62. The force transmission mechanism includes an elongated rearward beam 76 ~~slidably supported at one end 77 by the cocking lever 70 and pivotally connected at an opposite end 78 to the slider 90~~ pivotally connected at a first end 78 to the slider 90 and slidably supported at an opposite end 77 by the cocking lever 70. In one specific embodiment, the beam 76 is connected to the beam-slide connector 94 of the slider 90. A forward beam 80 is pivotally connected at one end 81 to the housing 20. In one specific embodiment, the forward beam is engaged to the forward end 25 of the housing 20. A beam bearing 85 is slidably supported by the cocking lever 70 and pivotally connects the ends 77, 82 of the beams 76, 80.

[0052] The operation of one embodiment of the force transmission mechanism 75 and the cocking slider 90 is shown in Figures 8-13. In Figure 8, the device 10 is shown in a resting state with the safety off and the cover 19 open. The safety is then turned to the safety-on position, which prevents actuation of the trigger. In the safety-on position, the cocking lever 70 is unlatched and opens as shown in Figure 9. As the cocking lever 70 swings open, the cocking slider 90 moves forward so that the forward engagement member 92 is aligned with the forward carrier engagement portion. Upon actuation of the cocking lever 70, force *F* is applied to the bar 93 at the beam-slider connector 94. Because the connector 94 is forward of the center 95 of the slider bar 93 and the rearward end 96 of the slider 90 rests on the engagement portion 56 of the rearward carrier 52, the forward end 91 of the slider tips toward the forward carrier ~~[[92]]~~ 62 to engage the forward engagement member 92 with the forward carrier 62. As the cocking lever is closed, the slider 90 is forced backward and drags the forward carrier to the cocked position against the bias of the spring 65 as shown in Figure 10.

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[0058] Therefore, upon actuation of the cocking lever 70, the forward end 91 of the slider 90 tips toward the forward carrier 62 when the forward carrier 62 is in the resting position, and alternately, the forward end 91 rests upon the forward ~~carrier 62 slider 61~~ and the rearward end 96 tips towards the rearward carrier 52 to align the rearward engagement member 97 with the rearward carrier 52 when the forward carrier 62 is in the cocked position.

[0061] Referring also now to FIGS. 4, 5 and 21, some embodiments provide an elongated lever latch linker 150 positioned parallel to the longitudinal axis 1. The lever latch linker 150 operably connects the lever latch 37 to a lever latch pusher 155 disposed in the rearward portion 27 of the housing. In one specific embodiment, the linker 150 includes a hollow tube 151. The lever latch linker 150 is preferably biased in the forward direction along arrow F so that the lever latch is biased in the forward direction f $[[F]]$ to disengage the lever hook 74. The linker 150 is movable in the rearward direction R in response to movement of the rearward carrier 52 to the first cocked position. When the rearward carrier 52 is in the cocked position, the lever latch pusher 155 is pushed in the rearward direction, which holds the latch 37 in the engaged position. Therefore, when the rearward carrier 52 is in the cocked position, the lever latch 37 is engaged to the lever hook 74 and the cocking lever 70 is closed against the lever wall 36.

[0063] The trigger mechanism is automatically blocked by one of the rotating one of the safety knobs 130, 140 to release the cocking lever 70 as discussed above. The safety knobs may physically block access to the trigger buttons, although this is not necessary. In one embodiment, the safety knob 140 includes a flattened skirt member 141 that slides under trigger button 115 to prevent depression of the button. The trigger can be actuated when the safety knob is rotated so that the recess 142 is aligned with the trigger button 115.

[0066] In one embodiment shown in FIGS. 30-32, the forward retaining member 68 is disposed on the transverse wall 35. The center elliptical member 44 includes the center elliptical plate 45 and a tubular portion 46 coaxially aligned with the center shaft 40. The tubular portion 46 has a diameter greater than an outer diameter of the shaft 40. An internal

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spring 39 is disposed around the center shaft 40 as shown in Figure 30 and acts between the tubular portion 46 and the forward carrier 62. The rearward carrier 52 is disposed against the center plate 45 when the rearward carrier 52 is in the resting position as shown in FIG. 31. When the forward carrier 62 is moved to the cocked position shown in FIG. 32, the internal spring 39 pushes the center elliptical member 44, which then acts upon the rear carrier 52 and pushes it to a staging position shown in FIG. 32. The rear carrier 52 is now optimally positioned to receive the rearward engagement member 97 of the cocking slider 90.